Simulation Based Acquisition

Key Enabler to Digital Acquisition

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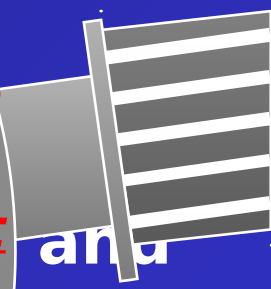
Army Acquisition Vision

The *World's Best* … spectrum force - traine… tory. A Total Force … *civilians:*

- **A *values* …**
- **An integ…**
- **Equippe… and equipme… Country**
- **Able to r…**
- ***Changing* … tomorrow… the 21st Cent…**

A dynamic organization which provides the warfighters affordable world class weapon systems and services years before any adversary can acquire comparable technological capability. Systems are continuously modernized and the cost of ownership drastically reduced each year. Quality people, teamwork and caring leadership are the heart of the Army Acquisition Organization.



The Acquisition Challenge

Reduce Cycle-time to IOC by 50% and TOC to 30%.

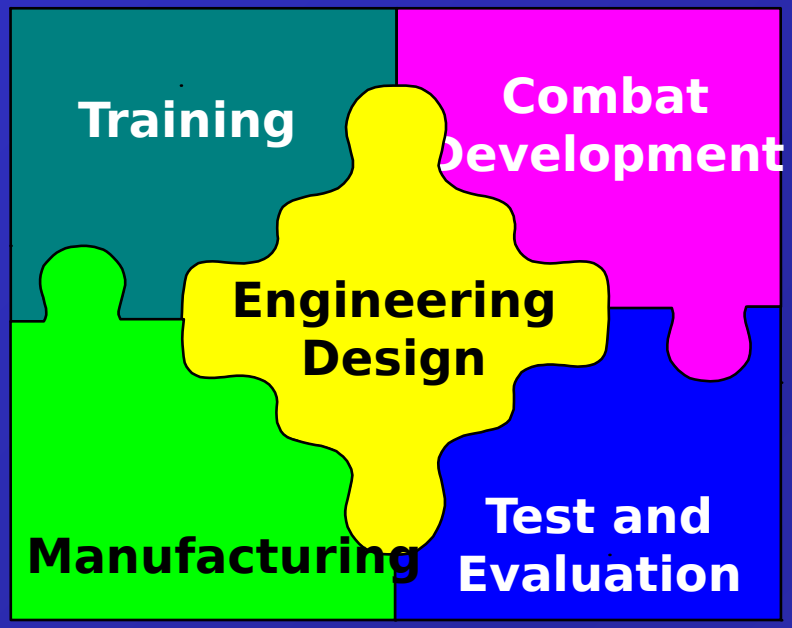
DSAC Goal

How Do We Accomplish These DSAC Goals?

The Funding Challenge

Continue Force Modernization with Fewer RDA Dollars

Why SBA?



Cannot Piece the Acquisition Process Together Without the Integrated Use of Modeling and

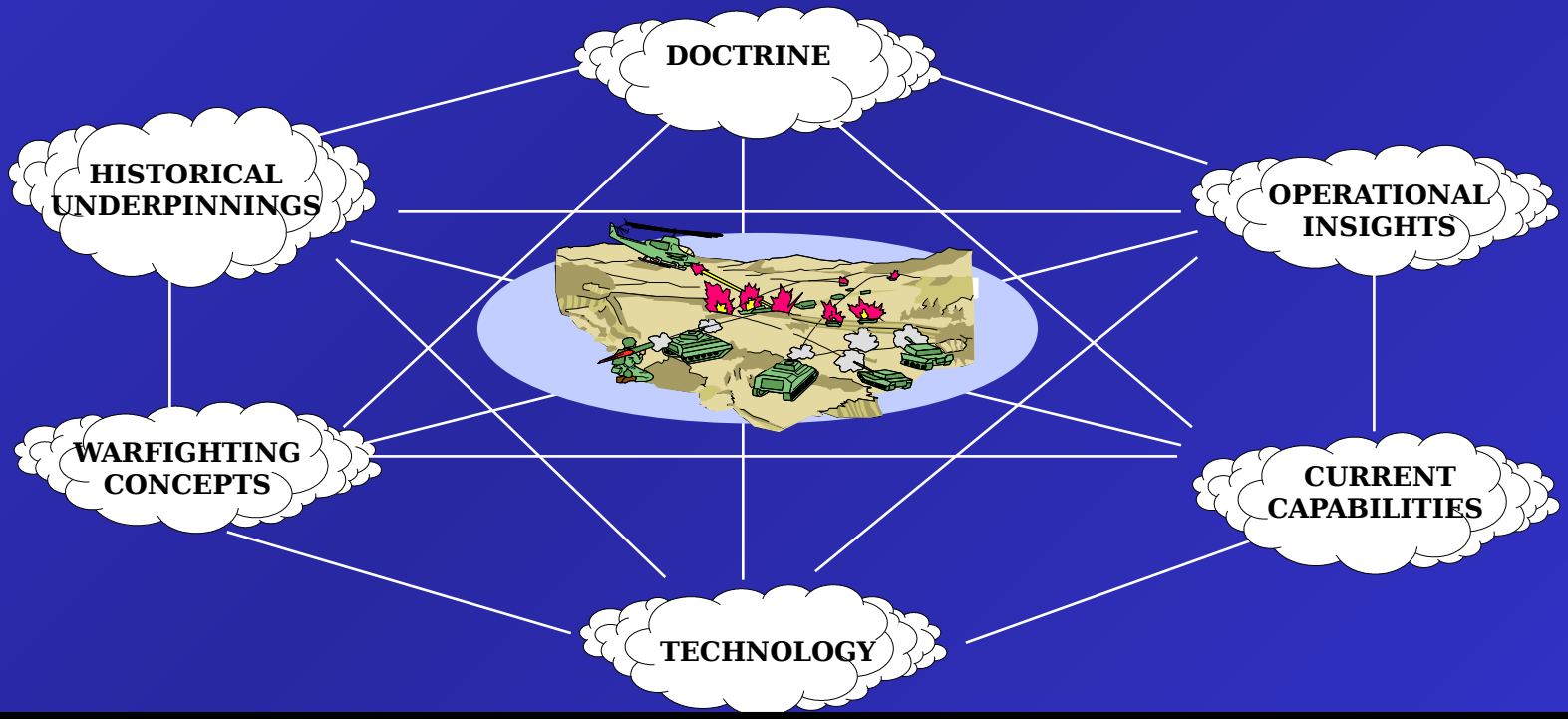
Won’t meet time and cost reduction goals without SBA!

What is SBA?

SBA is the integrated process, culture, and environment through which quality products are rapidly and economically developed, fielded and sustained.
Modeling & Simulation enables the execution of SBA.

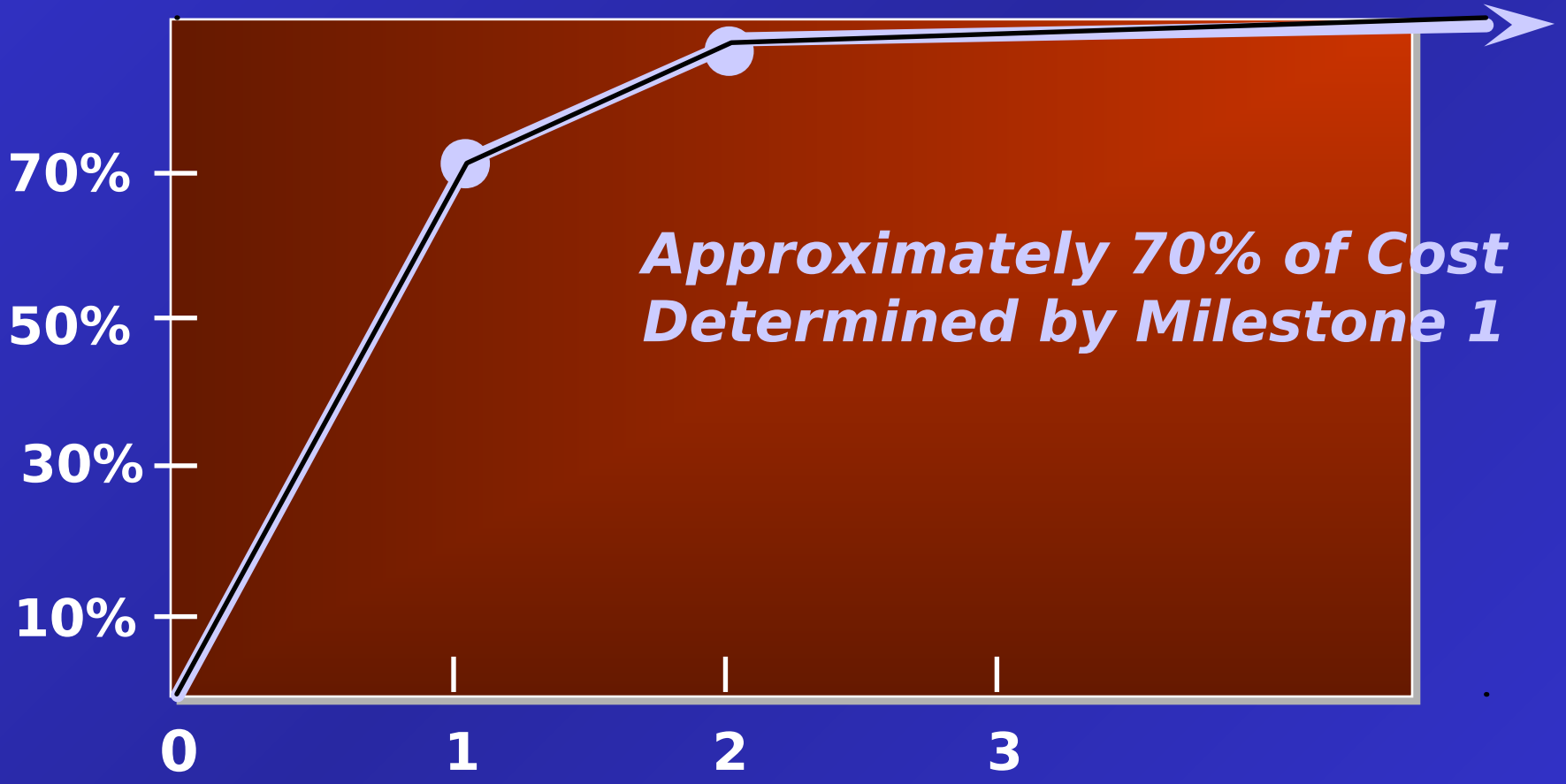
SBA Begins When a Material Need is Identified . . .

- Capability Based Fighting Force
- First to Field Capability
- First to Change Capability
- Capability determined in Synthetic Environment



Need a Common Synthetic Environment and Standards

Why Does it Begin So Early?



Up Front and Continuous Attention Needed on Ownership Costs

Life-Cycle Cost Distribution

Installation (14%)

Documentation (2%)

Design (12%)

Fabrication (72%)

Acquisition Costs 28%

Miscellaneous (1%)

POL (32%)

Personnel (67

Operations Costs 12%

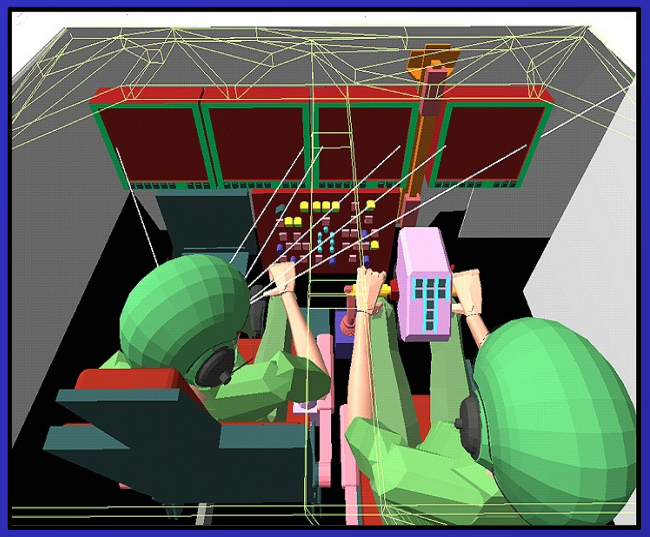
Replenishment/Spares (20%)

Repair Material (10%)

Maintenance/Labor (70%)

Logistics Support Costs 60%

SBA Continues . . .



. . . Through Development, Testing and Fielding of System

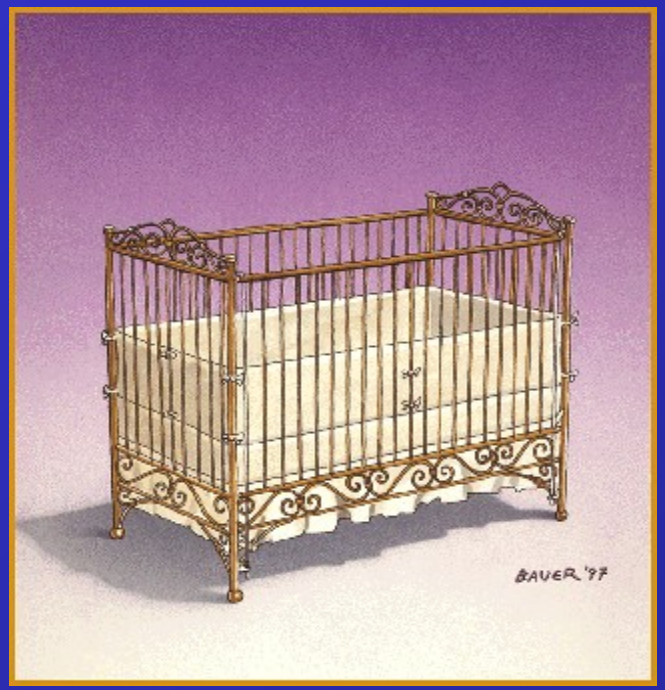
. . . And Ends When Systems Have Been Retired

What Enables SBA for the Army?

- **Published May 1997**
  (also via SARDA web site: www.sarda.army.mil)
- **Easy to Use**
- **Outline Format**
- **Incorporate into Deskbook**
- **Offered to Other Services**

Simulation Support Plan Guidelines

Using M&S Does Not Imply SBA



Must use M&S

Throughout Life-Cycle

SBA = *Integrated, collaborative* use of M&S from Cradle to Grave

OSD Guidance

Dr. Jacques Gansler, USD (A&T):

- "We must change the way we do business and embrace the examples of the private sector."
- "It is esential that we plan for the use of M&S in our acquisition strategies."
- "We must take bold, innovative strides to encourage increased collaboration and leverage available and developing simulation technologies between DoD and Industry."

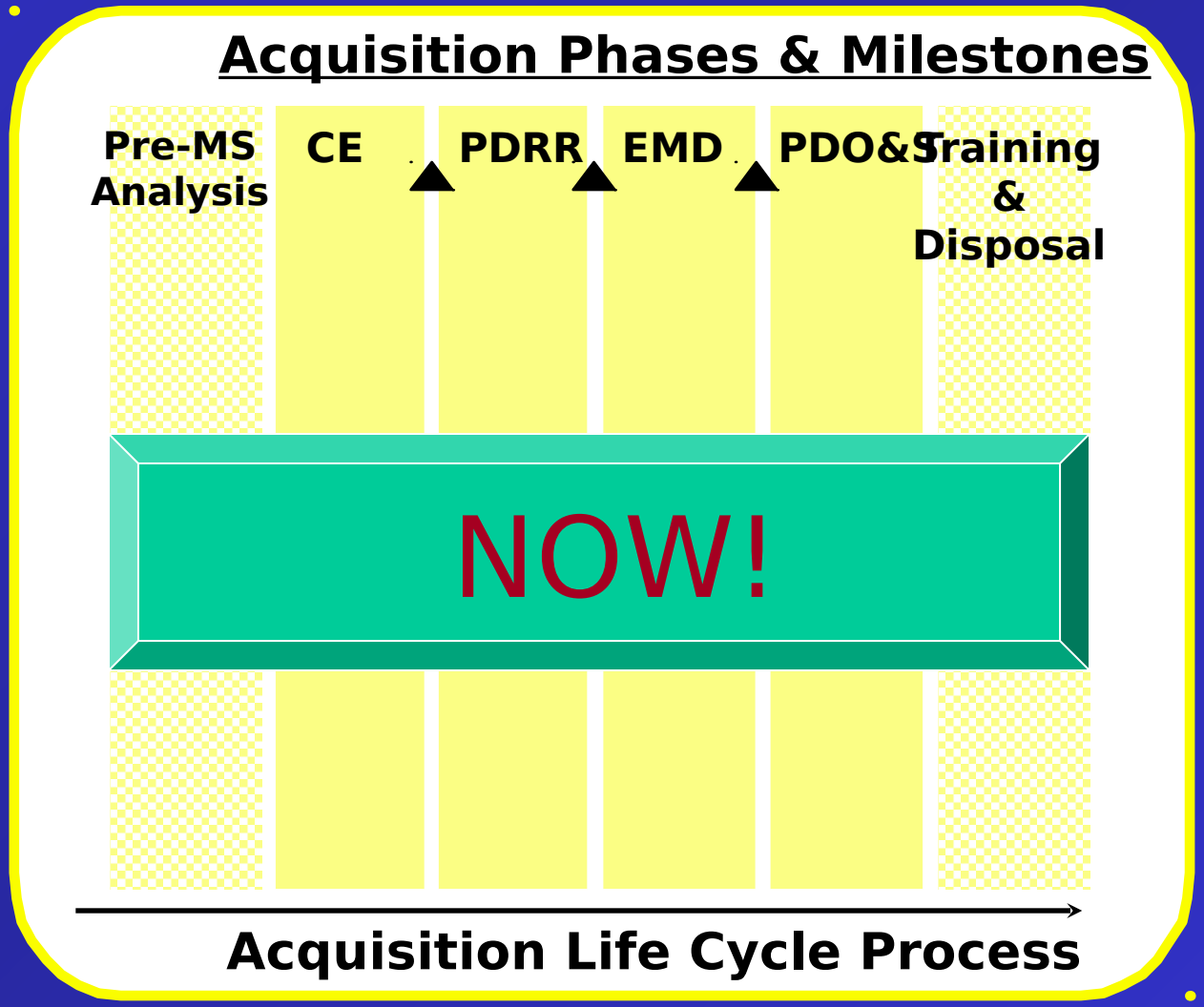
16 March 1998 USD (A&T) Memo

Donna Richbourg, DUSD (Acq Reform):

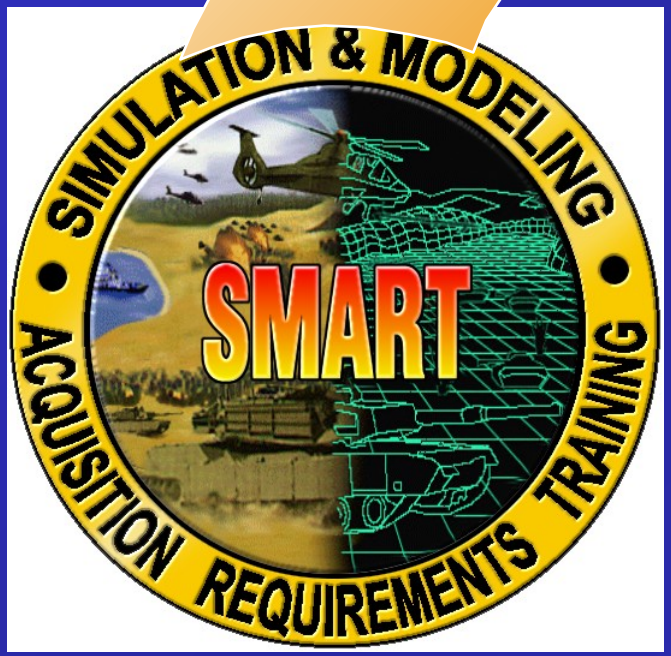
- "No problem with SBA and acquisition reform."

NDIA SBA Symposium (March 1998)

Implementation Timeline



Simulation and Modeling for Acquisition, Requirements and Training (SMART)



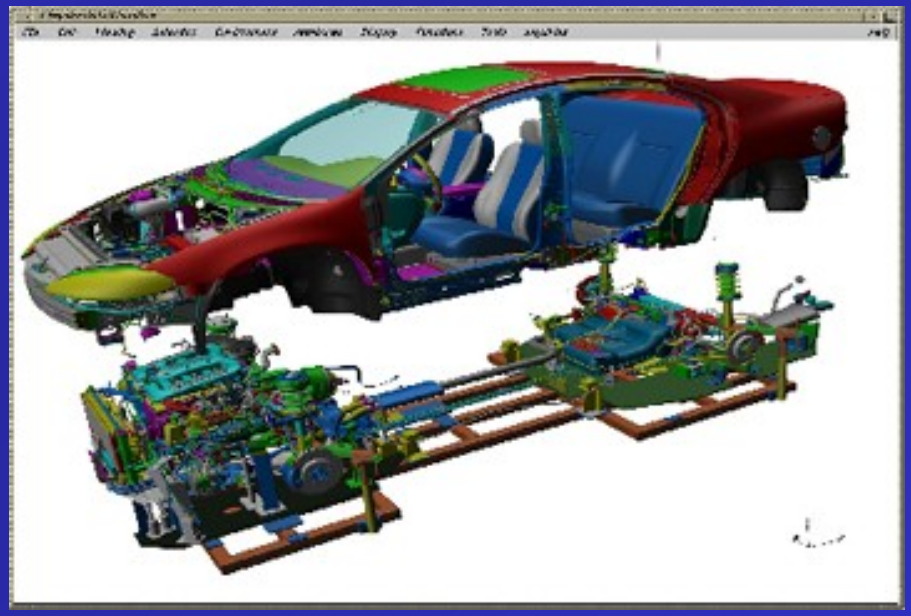
The Army's vision for SMART is a process in which we capitalize on Modeling and Simulation (M&S) technology to address the issue of system development and life-cycle costs through the combined efforts of the requirements, training and

What Will SMART Achieve?

- Reduced Total Ownership Cost (TOC), Time to Initial Operating Capability (IOC), and Logistics Tail
- Increased Supportability, Maintainability, and Military Worth

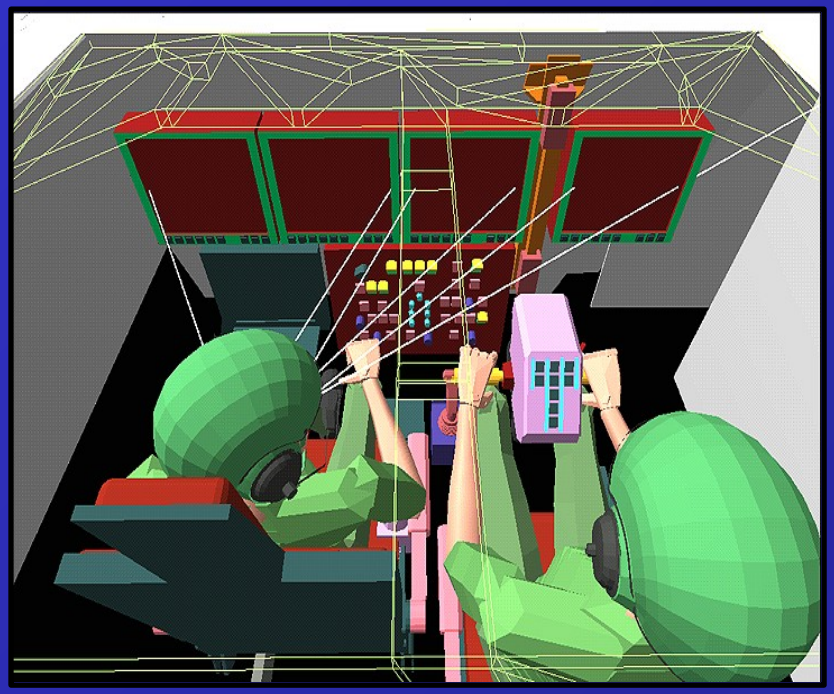
- More Effective, Cost Efficient Training at Individual, Crew, and System Level

How Does SMART Reform Acquisition?



- SMART Enables the Acquisition Workforce to Depict System Design Alternatives Digitally and Provide Access to all System Stakeholders
- Distributed Access to Developing Digital Design Allows Assessment of Proposed Changes for Impacts to all Acquisition Functions
- System Design Evolves With Optimization Across all functions vice at the Expense of one another

Test and Evaluation

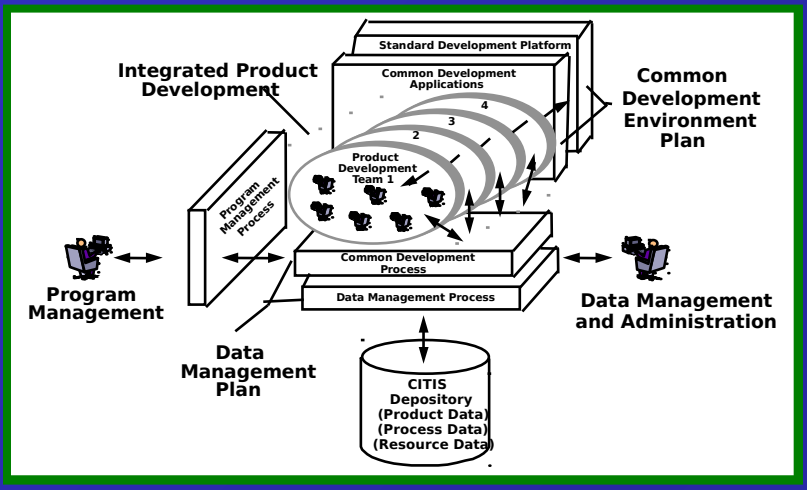


Design Model for Assessing MANPRINT for Grizzly Breacher

- Incorporate Long Term Planning for the Right mix of Simulation and Testing
- Evolve the Virtual T&E Infrastructure
- Conduct “What-if” Drills for Early Development of T&E Plans and Scenarios
- Accelerate the Synergies Between the Testing and Training Communities
- Ensure T&E Community Participation in all M&S Planning and Accreditation to Facilitate Acceptance

Digital Acquisition

Deputy Secretary of Defense **Mandate for Digital Acquisition by 2002:**
PMs establish Integrated Digital Environment (IDE) in which to conduct acquisition functions to include program management, contracting, financing, design, test and evaluation, etc…



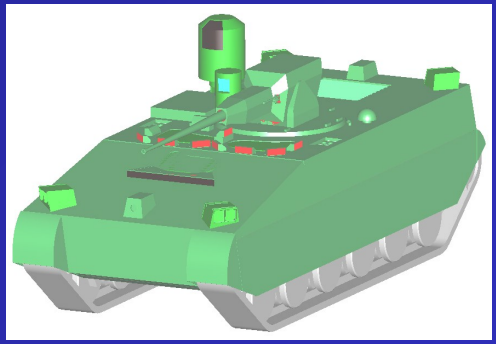
Combat Mobility Systems distributed Integrated Digital Environment

- **SMART Leverages IDE to Support Seamless Data Transfer Across Acquisition Functions, Phases, and Programs**
- **IDE Facilitates Seamless Data Transfer Between the Advanced Concepts and Requirements (ACR); the Research, Development and Acquisition (RDA); and the Test, Exercises and Military Operations (TEMO) Domains to Support Smart Product Model Initiative, System Supportability, Training, etc.**

How Do We Institutionalize SMART?

- Simulation Support Plans (SSP)
- Army Flagship Programs:
  - Apache
  - Close Combat Tactical Trainer (CCTT)
  - Crusader
  - Future Scout and Cavalry System (FSCS)
- Symposium (27-29 Jan 99 in San Antonio, TX)

Future Scout and Cavalry System (FSCS)



- FSCS Prior to MS I
- Ideally Poised to Benefit From SMART
- FSCS Being Developed Jointly With UK; use of M&S Facilitates the Collaboration
- FSCS can be Developed Through Distributed Product Description Approach

What is the Role of the Requirements Community?

- Cost/Performance Tradeoff Analysis
- Early ID of Unrealistic Requirements
- Early ID of Enabling Technologies
- Earlier Opportunity to Address Life Cycle Cost
- Use Smart Product Models to aid Threat Assessment & Mission Area Analysis

What is the Role of the Training Community?

- **Assess Impact of TTP and Doctrine on Design Concepts**
- **Trained Crew Simultaneous w/ 1st Unit off Production Line**
- **Re-use of Software and Simulation to Support Embedded and Distributed Training**

DARPA
Smart Enterprise Model

Digital End-To-End Simulation

PAC-3 Simulation

- Simulation of Patriot Engagement with PAC-3 Missile From System Emplacement through Lethality Assessment
- Demonstrates Compliance with Majority of System Performance Related Requirements and Supports Milestone III
- Combines Several Models to Form Highest Fidelity End-to-End Simulation of PAC-3 System
- Provides 1-on-1 Performance Estimates and Pk Estimates

Virtual Prototyping

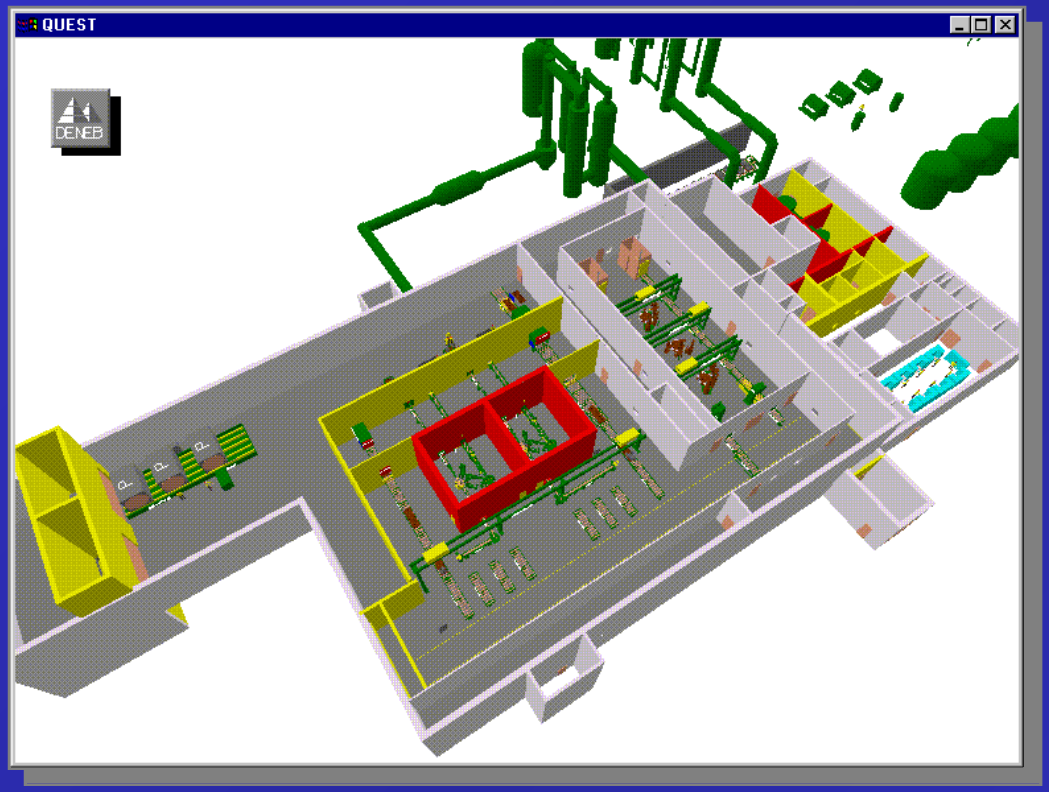
ARL Collision Simulation

- Representation of SADARM Submunitions in Airstream
- Developed to Determine Airflow of Submunitions
- Provides for Design Modification to Eliminate Collision Effects of Submunitions
- Supports Analysis of Separation Distances Versus Time Between Two Submunitions

"If there had been a model created early in the program of two submunition bodies spinning off axis during the initial stages of development, which would have analyzed the adverse effects of colliding submunitions, a different design may have been selected."

SADARM Deputy PM

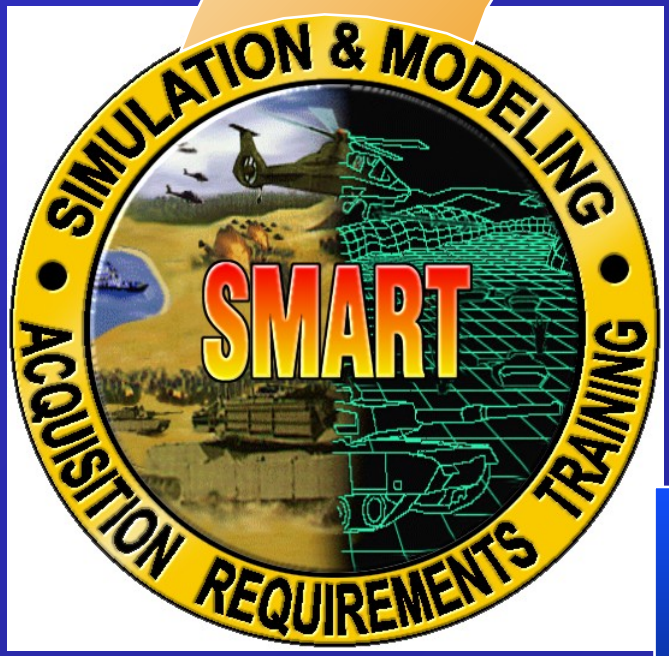
Computer Aided Manufacturing

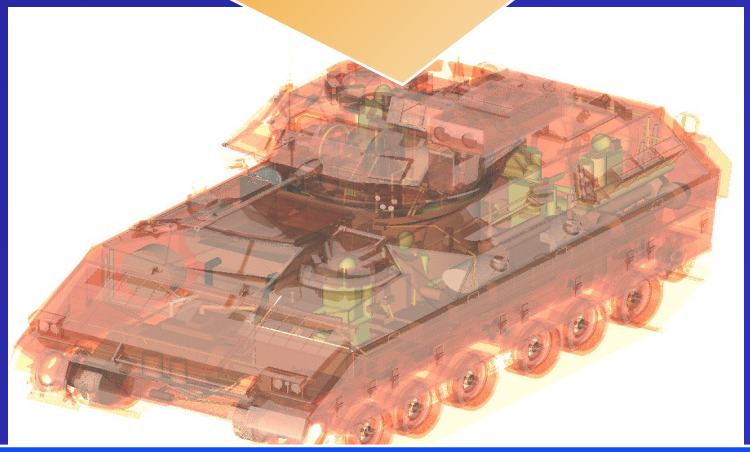


Tooele Chemical Agent Disposal Facility (TOCDF) Model

- **Establish Plant Performance Standards for Use in Comparisons of Alternative Facility, Campaign, and Process Configurations**
- **Provide Indication of the Effectiveness of Plant Improvements Over Time as a Result of Lessons Learned**
- **Suggest Areas for Future Modifications to Improve Throughput and Availability**
- **Conduct Reliability, Availability, and Maintainability (RAM) of**

What Will a SMART Future Look Like?





Assessment of Virtual Prototypes in Synthetic Environments Allows Stakeholders to Evaluate Systems for Compliance with Requirements, Performance, Optimized Design, and TTP and Doctrine Development

The Challenge

Who will be first to field a system that is developed, evaluated, and manufactured through SBA?